CLAIMS

1. A method for forming an anodic oxide layer on a surface of aluminum or an aluminum alloy, being characterized by performing an anodic oxidation treatment by using a bath liquid which involves an aqueous solution containing 250 gr/l to 350 gr/l of sulfuric acid and 15 gr/l to 25 gr/l of nickel sulfate under the following conditions:

(a) bath liquid temperature: −10°C to +25°C;

(b) voltage: DC 100 V to 200 V; and

(c) current density: 0.5 A/dm^2 to 20 A/dm^2.

2. The method for forming the anodic oxide layer on the surface of aluminum or the aluminum alloy according to Claim 1, being characterized by using a bath liquid further added with a low polymerization acrylic resin composition in the range of from 280 gr/l to 320 gr/l.

3. The method for forming the anodic oxide layer on the surface of aluminum or the aluminum alloy according to Claim 1 or 2, being characterized by using a bath liquid further added with tartaric acid in the range of from 5 gr/l to 15 gr/l.

4. The method for forming the anodic oxide layer on the surface of aluminum or the aluminum alloy according to any one of Claims 1 to 3, being characterized by performing an anodic oxidation treatment under the following conditions:

(d) bath liquid temperature: −10°C to −5°C;

(e) voltage: DC 130 V to 170 V; and

(f) current density: 8 A/dm^2 to 12 A/dm^2.

5. The method for forming the anodic oxide layer on the surface of the aluminum alloy according to Claim 4, wherein the aluminum alloy to be treated is an aluminum alloy selected from the group consisting of duralumin, an aluminum alloy for a die cast and an aluminum alloy without containing Mn.

6. The method for forming the anodic oxide layer on the surface of the aluminum alloy according to any one of Claims 1 to 3, being characterized by performing the anodic oxidation treatment on a surface of an aluminum alloy containing Mn under the following conditions:

(g) bath liquid temperature: +15°C to +18°C;

(h) voltage: DC 130 V to 170 V; and

(i) current density: 8 A/dm^2 to 12 A/dm^2.

7. A method for forming an anodic oxide layer on a surface of aluminum or an aluminum alloy, being characterized in that, after the anodic oxide layer is formed on the surface of aluminum or the aluminum alloy by a method according to any one of Claims 1 to 6, silver is impregnated in the anodic oxide layer by using a bath liquid which involves an aqueous solution containing 10 gr/l to 30 gr/l of silver sulfate or silver nitrate, 15 gr/l to 20 gr/l of boric acid and 1 gr/l to 2 gr/l of nickel sulfate

under the following conditions:

(j) bath liquid temperature: +10°C to +20°C;

(k) voltage: AC 10 V to 15 V;

(l) current density: 1 A/dm^2 to 2 A/dm^2; and

(m) current applying period: 2 minutes to 3 minutes.

8. A method for forming an anodic oxide layer on a surface of aluminum or an aluminum alloy, being characterized in that an anodic oxide layer having a thickness of 300 μm to 600 μm is formed on a surface of aluminum or an aluminum alloy by a method according to any one of Claims 1 to 6 and, after silver impregnation according to Claim 7 is performed, a surface layer is removed by polishing by a thickness of 50 μm to 100 μm and, then, an ultra-hard smooth surface is obtained.